Software Engineering Methodology

Chapter 4.0
Requirements Definition Stage

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Chapter: **4.0**
Requirements Definition Stage

Description: The primary goal of this stage is to develop a basis of mutual understanding between the system owner/users and the project team about the requirements for the project. The result of this understanding is an approved Software Requirements Specification that becomes the initial baseline for software product design and a reference for determining whether the completed software product performs as the system owner requested and expected.

This stage involves analysis of the system owner/users' business processes and needs, translation of those processes and needs into formal requirements, and planning the testing activities to validate the performance of the software product.

Input: The following work products provide input to this stage.

- Project File
- Description of user environment
- Statement of project scope and objectives
- Statement of high-level project requirements
- Functional area contact list and project profile
- Summary of platform options
- Statement of project feasibility
- Analysis of Benefits and Costs Report
- Feasibility Study Document
- Project Plan
- Software Quality Assurance Plan
- Software Configuration Management Plan

High-Level Activities: The remainder of this chapter is divided into sections that describe specific high-level activities performed during this stage. These activities represent the minimum requirements for a large software engineering effort. *Notes* are provided, as applicable, to assist in customizing these lifecycle stage requirements to accommodate different sizes of software engineering efforts. The high-level activities are presented in the sections listed below.

High-Level Activities, continued:

4.7 Develop Acceptance Test Plan
4.8 Select Design Technique
4.9 Revise Project Plan
4.10 Conduct Structured Walkthroughs
4.11 Conduct In-Stage Assessment
4.12 Conduct Requirements Definition Stage Exit

Output: Several work products are developed during this stage. The work products listed below are the minimum requirements for a large software project. Deviations in the content and delivery of these work products are determined by the size and complexity of a project. Explanations of the work products are provided under the applicable activities described in the remainder of this chapter.

- Description of analysis technique
- Records of all project requirements
- User-oriented requirements manual *(optional)*
- Continuity of Operations Statement/Plan
- Data Dictionary
- Requirements Traceability Matrix
- Software Requirements Specification
- Project Test Plan
- Acceptance Test Plan *(draft)*
- Design technique
- Project Plan *(revised)*

A matrix showing the work products associated with each high-level activity is provided in *Exhibit 4.0-1, Requirements Definition Stage Activities and Work Products by Project Size*. The matrix also shows which work products are deliverables and whether they are required or optional for small, medium, and large products.

Review Process: Quality reviews are necessary during this stage to validate the product and associated work products. The activities that are appropriate for quality reviews are identified in this chapter and the Lifecycle Model chapter. The time and resources needed to conduct the quality reviews should be reflected in the project resources, schedule, and work breakdown structure.

References: Lifecycle Model Chapter, *Quality Reviews*, provides an overview of the Quality Reviews to be conducted on a project.

Appendix C, *Conducting Structured Walkthroughs*, provides a procedure and sample forms that can be used for structured walkthroughs.

References, continued:

Appendix D, *In-Stage Assessment Process Guide*, provides a procedure and sample report form that can be used for in-stage assessments.

Appendix E, *Stage Exit Process Guide*, provides a procedure and sample report form that can be used for stage exits.

Resource:

DOE Software Management Program Web site.

Bibliography:

The following materials were used in the preparation of the Requirements Definition Stage chapter.

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5. The Institute of Electrical and Electronics Engineers, Inc., *IEEE Guide to Software Requirements Specifications*, ANSI/IEEE Std 830-1984, New York, 1984.

6. The Institute of Electrical and Electronics Engineers, Inc., *IEEE Standard for Developing Software Life Cycle Processes*, IEEE Std 1074-1991, New York, 1992.

7. The Institute of Electrical and Electronics Engineers, Inc., *IEEE Standard for Software Verification and Validation Plans*, ANSI/IEEE Std 1012-1986, New York, 1986.

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Bibliography, continued:

9. U.S. Department of Energy, Software Quality Assurance Subcommittee, *Guidelines for Software Requirements Management*, July 1998

10. U.S. Department of Labor, Directorate of Information Resources Management, *Systems Engineering Concepts and Procedures Manual*, 1988.

11 U.S. Department of Labor, Directorate of Information Resources Management, *Systems Engineering Standards Manual*, 1988.

Exhibit 4.0-1. Requirements Definition Stage Activities and Work Products by Project Size

Work Activity		Project Size L	M	S	Work Product	Deliverables L	M	S
4.1	Requirements Management	R	R	R	Requirements Traceability Matrix Software Change Request Form Software Change Control Log	R A A	R A A	A A A
4.2	Select Requirements Analysis Technique	R	R	R	Description of Analysis Technique	I	I	I
4.3	Define Project Requirements	R	R	R	Records of Project Requirements User-Oriented Requirements Manual *(optional)* Continuity of Operations Statement/Plan Data Dictionary	I O R R	I O R R	I O R R
4.4	Compile and Document Project Requirements	R	R	R	Software Requirements Specification *(draft)*	R	R	R
4.5	Establish Functional Baseline	R	R	R	Software Requirements Specification *(final)*	R	R	R
4.6	Develop Project Test Plan	R	R	A	Project Test Plan	R	R	A
4.7	Develop Acceptance Test Plan	R	R	R	Acceptance Test Plan *(draft)*	R	R	R
4.8	Select Design Technique	R[2]	R[2]	R[2]	Design Technique	N[2]	N[2]	N[2]
4.9	Revise Project Plan	R	R	R	Project Plan *(revised)*	R	R	R
4.10	Conduct Structured Walkthrough(s)	R	R	A	Structured Walkthrough Management Summary Report	N	N	N
4.11	Conduct In-Stage Assessment	R	R	A	ISA Report Form[1]	N	N	N
4.12	Conduct Requirements Definition Stage Exit	R	R	A	Stage Exit Meeting Summary	N	N	N

Size: L = Large, M = Medium, S = Small

Minimum Requirements: R = Required, A = As Appropriate, N = Not a Deliverable[3]

I = Input to other deliverables
O = Optional work product
[1] = Completed by reviewer
[2] = Can adapt an existing plan

[3]A deliverable is a work product that is identified in the Project Plan and is formally delivered to the system owner and other project stakeholders for review and approval.

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